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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Thilo-Ralf Bodo

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CROWELL & MORING LLP
INTELLECTUAL PROPERTY GROUP
P.O. BOX 14300
WASHINGTON, DC 20044-4300

EXAMINER

TRAN, DIEM T

ART UNIT

PAPER NUMBER

3748

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/524,999

Applicant(s)

BODO ET AL.

Examiner

Diem Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-50 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 19-45 and 49 is/are rejected.
- 7) ☒ Claim(s) 46-48 and 50 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

An Applicant's Preliminary Amendment filed on 2/17/05 has been entered. In this preliminary amendment, claims 1-18 have been canceled and claims 19-50 have been added. Overall, claims 19-50 are pending in this application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19, 20, 22, 23, 25-27, 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Gunther et al. (US Patent 6,662,552).

Regarding claims 19, 42, Gunther discloses an internal combustion engine comprising:

an exhaust gas line in which an NOx reduction catalytic converter (3) is arranged, and a reducing agent-generating unit for generation of H₂-containing and NH₃-containing reducing gas which can be added upstream of the NOx reduction catalytic converter (3) in the exhaust gas line (see Figure 1), wherein the reducing agent-generating unit can be supplied with at least one of an HC-containing fuel, air, and exhaust gas, and wherein the reducing agent-generating unit has an NOx generation step (5) and an H₂ generation step

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(running engine with a rich air-fuel ratio) in serial arrangement (see col. 3, lines 10+, col. 4, lines 1-11).

Regarding claim 20, Gunther further discloses that the NO_x generation step (5) is arranged downstream from the H₂ generation step (running engine with a rich air-fuel ratio) (see Figure 1, col. 3, lines 10-48, col. 4, lines 4-11).

Regarding claims 22, 23, Gunther further discloses that an NH₃ generation step (4) arranged downstream from the NO_x generation step (5) (see Figure 1).

Regarding claims 25-27, Gunther further discloses that the reducing agent-generating unit can be operated alternately in first and second operating modes in such a way that, during the first operating mode, an NO_x -containing gas can be produced and, during the second operating mode, an H₂-containing and NH₃ containing reducing gas can be produced (see col. 4, lines 49-65).

Claims 43-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Kinugasa et al. (US Patent 6,109,024).

Regarding claims 43-45, Kinugasa discloses a process for operation of an internal combustion engine having a reducing agent-generating unit and an exhaust gas line in which an NO_x reduction catalytic converter (9) is arranged, whereby a reducing gas produced by the reducing agent-generating unit is added upstream of the NO_x reducing catalytic converter to the exhaust gas, wherein generation of the reducing gas comprises:

generating an NO_x containing gas from an NO_x generation stage; and
intermediately storing NO_x when conducting the NO_x containing gas produced through an NO_x intermediate storage unit which is arranged downstream from the NO_x

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generation stage and allocated to the reducing agent-generating; and reacting NO_x stored in the NO_x intermediate storage unit with the gas produced into NH₃ so that a reducing gas containing H₂ and NH₃ is produced (see Figure 23, col. 28, lines 1-18).

Claim 49 is rejected under 35 U.S.C. 102(e) as being unpatentable over Mulligan (US patent 6,739,125).

Mulligan discloses a process for operation of an internal combustion engine having a reducing agent generating unit and an exhaust gas line in which an NO_x reduction catalytic converter (44) is arranged, whereby a reducing gas produced by the reducing agent-generating unit is added upstream from the NO_x reducing catalytic converter to the exhaust gas (see Figure 1), wherein generation of the reducing gas comprises:

generating an NO_x-containing gas (running engine with a lean air-fuel ratio) from an NO_x generation stage allocated to the reducing agent-generating unit from air supplied to the NO_x generation stage; and generating an H₂-containing gas and an NH₃-containing reducing gas from an H₂ generation stage (24) allocated to the reducing agent-generating unit and arranged downstream from the NO_x generation stage based on fuel fed to the H₂ generation stage, NO_x containing gas produced, fuel supplied, and at least one of air and exhaust gas (see col. 2, lines 45+, col. 3, lines 1-10, col. 4, lines 18-38).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21, 24, 28, 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther et al. (US patent 6,662,552) in view of Mulligan (US Patent 6,739,125).

Regarding claim 21, Gunther discloses all the claimed limitations as discussed in claim 19 above, however, fails to disclose that the NO_x generation step is arranged upstream from the H₂ generation step. Mulligan teaches that the NO_x generation step is arranged upstream from the H₂ generation step (24) (see Figure 1, col. 2, lines 29-33).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching of Mulligan in the method of Gunther, since the use thereof would have provided an effective means to provide additional NO_x for generating the ammonia.

Regarding claim 24, Mulligan further teaches that an NH₃ generation step (24) is arranged downstream from the NO_x generation step (see Figure 1, col. 4, lines 18-38).

Regarding claim 28, Gunther further discloses that the reducing agent-generating unit can be operated alternately in first and second operating modes in such a way that, during the first operating mode, an NO_x -containing gas can be produced and, during the second operating mode, an H₂-containing and NH₃ containing reducing gas can be produced (see col. 4, lines 49-65).

Regarding claims 37-39, Gunther further discloses that the H₂ generation step is designed for reaction of supplied NO_x into NH₃ (see col. 3, lines 10-40).

Claims 29-31, 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther et al. (US Patent 6,662,552) in view of Kinugasa et al. (US Patent 6,109,024).

Regarding claims 29-31, Gunther discloses all the claimed limitations as discussed in claims 25-27 above, however, fails to disclose that an NO_x intermediate storage unit arranged downstream from the NO_x generation step. Kinugasa teaches that an NO_x intermediate storage unit (7) is arranged downstream from the NO_x generation step (see Figure 12, col. 28, lines 1-18).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching of Kinugasa in the method of Gunther, since the use thereof would have provided an effective means for storing the NO_x in the exhaust gas.

Regarding claims 33-35, Kinugasa further teaches that the NO_x intermediate storage unit (7) is designed for reaction of stored NO_x with H₂ to NH₃ (see Figure 23, col. 28, lines 1-15).

Claims 32, 36, 40, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther et al. (US patent 6,662,552) in view of Mulligan et al. (US Patent 6,739,125) as applied to claim 28 above, and further in view of Kinugasa et al. (US Patent 6,109,024).

Regarding claim 32, the modified Gunther device discloses all the claimed limitations as discussed in claim 28 above, however, fails to disclose that an NO_x

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intermediate storage unit arranged downstream from the NO_x generation step. Kinugasa teaches that an NO_x intermediate storage unit (7) is arranged downstream from the NO_x generation step (see Figure 23, col. 28, lines 1-18).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching of Kinugasa in the method of Gunther, since the use thereof would have provided an effective means for storing the NO_x in the exhaust gas.

Regarding claim 36, Kinugasa further teaches that the NO_x intermediate storage unit (7) is designed for reaction of stored NO_x with H₂ to NH₃ (see Figure 23, col. 28, lines 1-15).

Regarding claims 40, 41, Gunther further discloses that the H₂ generation step is designed for reaction of supplied NO_x into NH₃ (see col. 3, lines 10-40).

Allowable Subject Matter

Claims 46-48, 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication from the examiner should be directed to Examiner Diem Tran whose telephone number is (571) 272-4866. The examiner can normally be reached on Monday -Friday from 8:30 a.m - 6:00 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (571) 272-4859. The fax number for this group is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 800-786-9199 (toll-free).

DT



Diem Tran
Patent Examiner
Art unit 3748



THOMAS DENION
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700